

Foraging and breeding biology of the Malabar Parakeet *Psittacula columboides* in the Siruvani foothills, Tamil Nadu, India

V. GOKULA and C. VENKATRAMAN

The Malabar Parakeet *Psittacula columboides* is one of 16 bird species endemic to the Western Ghats, India (Stattersfield *et al.* 1998). It occurs in the Western Ghats from north Maharashtra to south Kerala, chiefly between 500 and 1,500 m (Ali and Ripley 1987). Although a common endemic (Gaston and Zacharias 1996), the Malabar Parakeet is poorly studied. We investigated the foraging and breeding behaviour of this species in the moist deciduous forest of the Siruvani foothills, Coimbatore, Tamil Nadu, India, from October 1995 to April 1996.

The Siruvani foothills lie in the core area of the Nilgiri Biosphere Reserve from 10°56'N to 10°58'N and from 76°42'E to 76°44'E, at an elevation of 350–650 m. The area receives both south-west and north-east monsoons, with a mean annual rainfall of c.840 mm. The river Noyil drains this area. The vegetation type has been classified as southern tropical moist deciduous forest (Champion and Seth 1968), which merges with southern tropical evergreen forests at higher elevations in Muthikolam area of Kerala state. The commonest tree species in the study area are *Lagerstroemia lanceolata*, *Terminalia bellirica*, *Terminalia paniculata*, *Antidesma diandrum*, *Bauhinia malabarica*, and *Bauhinia racemosa* (Gokula *et al.* 1999).

METHODS

Foraging behaviour was quantified following Holmes *et al.* (1978). Birds were followed, and the first instance of taking a particular food item was recorded, along with the height, foraging method, substrate, plant species and food type. Foraging attempts were divided into seven height classes (0–2 m, 2.1–4 m, 4.1–6 m, 6.1–8 m, 8.1–10 m, 10.1–12 m and >12 m). All foraging attempts were assigned to ten substrate categories in three major classes: (1) plant form (tree, shrub); (2) branches (primary, secondary, tertiary, twigs); and (3) canopy (top, side, middle and lower). Most data were collected within the first four hours after sunrise. Each foraging attempt was considered as an independent observation for all analyses.

Breeding behaviour was observed using a 20x Kowa spotting scope from a hide. Intensive searches were made for nests in the study area, either by following individuals or by checking existing holes in trees. Tree species, diameter at breast height (dbh), height, and nest height and orientation were recorded for each nest hole. Later the nest was cut open, observed and then resealed, to determine the clutch size, incubation and nestling periods, following Yahya (1980).

RESULTS AND DISCUSSION

Foraging

Altogether 492 foraging observations were made, of which 287 referred to males and 205 to females. No foraging was observed on shrubs. Both sexes preferred the top and side canopy of trees for foraging (Table 1). Foraging attempts were largely made above 6 m from the ground (Table 2). All four food types (fruits, seeds, flowers and sprouting leaves) were used (Table 3). All the foraging observations were on *Grewia tiliaefolia*, *Tectona grandis* and *Melia dubia*, which are common tree species in the study area. Flowers and nectar were the predominant food for both sexes (Table 3). Ali and Ripley (1987) reported that grains and fruits were the preferred food of Plum-headed *Psittacula cyanocephala* and Malabar Parakeets, and that they also eat buds, petals and nectar. Balasubramanian (1986) reported that the Rose-ringed Parakeet *Psittacula krameri* feeds on leaves in the absence of fruits. During this study, fruit availability was low. The observed preference for flowers and sprouting leaves may therefore have been because the preferred food types were scarce.

Breeding

The Malabar Parakeet breeds in the study area during the dry season after the north-east monsoon (which falls in September–November), and nestlings fledge before

Table 1. Substrates used by foraging Malabar Parakeets (% frequency).

	Canopy			Branches			
	Top	Side	Middle	Primary	Secondary	Tertiary	Twigs
Male	81	15	4	4	7	19	70
Female	72	26	2	8	19	15	58

Table 2. Height classes at which Malabar Parakeets foraged (% frequency).

	Height class (m)					
	2.1–4	4.1–6	6.1–8	8.1–10	10.1–12	>12
Male	3	3	15	36	10	33
Female	2	6	22	41	15	14

Table 3. Food items taken by Malabar Parakeets (% frequency).

	Fruits	Seeds	Flowers	Leaves
Male	8	10	49	33
Female	3	18	61	18

the south-west monsoon in June to August. Mating was observed mainly in December. Eggs were mostly laid during the last week of December to the first week of January. Selection of the nest-hole takes place after many prolonged inspections of holes and hollows by both sexes. No nest materials were seen to be taken into the hole, and no excavation or alteration of the entrance hole was observed. Mean clutch size was 4 (range=2–5, n=11). The mean incubation period was 23 days (range=22–25, n=11). Initially, the female guarded the chicks and the male brought the food whereas later the roles were reversed. The male was first seen to bring food to the nest hole when the chicks were three days old. The mean fledging period was 32 days (range=31–34, n=11). The majority of chicks fledged during the last week of February to the first week of March. Eleven nests were located in three tree species: *Grewia tiliaefolia* (seven), *Melia dubia* (three) and *Tectona grandis* (one). The preponderance of *Grewia tiliaefolia* may be attributed to its greater height and spread. All three tree species are common in the study area and no immediate threat to them was evident. The mean height of the 11 nest trees was 14.5 m (range: 13.1 to 16.9 m). The mean nest hole height was 7.9 m (range: 4.8 to 8.3 m). The Malabar Parakeet breeds much earlier than other secondary hole nesters in the study area (Gokula *et al.* 1999), and this may reduce competition for nest holes. Chicks are occasionally caught by the local tribespeople.

V. Gokula, 7/153 Gurumoorthy Nagar, Ammachatram P.O., Kumbakonam, 612 103, Tanjore District, Tamil Nadu, India.
Email: gokulae@yahoo.com

C. Venkatraman, 152 Main Road, Tittakudi, 606 106, South Arcot District, Tamil Nadu, India.

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REFERENCES

- Ali, S. and Ripley, S. D. (1987) *Compact handbook of the birds of India and Pakistan*. Delhi: Oxford University Press.
- Balasubramanian, P. (1986) A note on Roseringed Parakeet (*Psittacula krameri*) feeding on the leaves of *Salvadora persica* in the Point Calimere Wildlife Sanctuary, Tamil Nadu. *J. Bombay Nat. Hist. Soc.* 86: 103.
- Champion, H. G. and Seth, S. K. (1968) *A revised survey of the forest types of India*. Delhi: Manager of Publications.
- Gaston, A. J. and Zacharias, V. J. (1996) The recent distribution of endemic and disjunct birds in Kerala State: preliminary results of an ongoing survey. *J. Bombay Nat. Hist. Soc.* 93: 389–400.
- Gokula, V., Venkataraman, C., Saravanan, S. and Swetharanyam, S. (1999) Inter- and intraspecific variation in the resource use of Blossomheaded and Bluewinged Parakeets in Siruvani, Tamil Nadu, India. *J. Bombay Nat. Hist. Soc.* 96: 225–231.
- Holmes, R. T., Sherry, T. W. and Bennett, S. E. (1978) Diurnal and individual variability in the foraging behaviour of American Redstart (*Setophaga ruticilla*). *Oecologia* 36: 141–149.
- Stattersfield, A. J., Crosby, M. J., Long, A. J. and Wege, D. C. (1998) *Endemic bird areas of the world: priorities for biodiversity conservation*. Cambridge: BirdLife International (BirdLife Conservation Series no. 7).
- Yahya, H. S. A. (1980) A comparative study of ecology and biology of barbets *Megalaima* spp. (Capitonidae: Piciformes) with special reference to *Megalaima viridis* and *M. rubricapilla malabarica* at Periyar Tiger Reserve, Kerala. Ph.D thesis, University of Bombay.

Breeding behaviour of Jerdon's Baza *Aviceda jerdoni* at Gunung Leuser National Park, Sumatra, Indonesia: the first nesting record for Sumatra

RALPH BUIJ

Jerdon's Baza *Aviceda jerdoni* is a widely distributed species which is largely resident in a discontinuous range from south-west India and Sri Lanka through parts of South-East Asia, the Philippines, and Indonesia (del Hoyo *et al.* 1994). It is relatively uncommon to rare throughout its range (del Hoyo *et al.* 1994, Ferguson-Lees *et al.* 2001). Due to its secretive breeding behaviour, its status in some parts of its range, in particular Sumatra, Vietnam and Peninsular Malaysia, is uncertain (Ferguson-Lees *et al.* 2001). It has been suggested that the handful of records from Sumatra (van Marle and Voous 1988, Holmes 1996) may at least partly be assigned to resident breeders (van Marle and Voous 1988). However, since no evidence exists to confirm breeding, records are generally ascribed to juvenile birds

dispersing or migrating into Sumatra from breeding sites in southern Thailand (Ferguson-Lees *et al.* 2001).

Between July 1998 and March 1999, I regularly observed an adult male and female Jerdon's Baza in the surroundings of the Ketambe Study Area, located in the centre of the Gunung Leuser National Park, Sumatra, Indonesia. The Ketambe Study Area (03°41'N 97°39'E, 350–700 m) comprises primary tropical lowland alluvial rainforest (Rijksen 1978). The Alas river, which is 50–100 m wide and edged by low scrubs, flows through the area. The Kutacane–Blangkejeren road (c.5–7 m wide) runs parallel to the river. The birds were identified as belonging to the subspecies *A. j. jerdoni* (four other subspecies are recognised: del Hoyo *et al.* 1994). In January 1999, the female was discovered sitting on